

REMARKS/ARGUMENTS

Reconsideration and allowance of this application are respectfully requested. Currently, claims 1, 3, 5, 7, 11, 13, 17, 19, 25, 27, 29, 31, 33, 35, 37, 45, 51, 59, 67, 75-82, 85-93, 99-103, 114-116, 119-123, 132-136, 145, 147 and 149-151 are pending in this application.

Rejections Under 35 U.S.C. §102 and §103:

Claims 1, 3, 5, 7, 11, 13, 17, 19, 23, 25, 27, 35, 37, 39, 43, 45, 49-51, 53, 59, 61, 75-85, 89-92, 94-97, 100-108, 113-118, 123-126, 131, 133-139 and 144-146 were rejected under 35 U.S.C. §102(b) as allegedly being anticipated by, or in the alternative under 35 U.S.C. §103 as being obvious over Suzuki et al. (U.S. '940, hereinafter "Suzuki").¹ Applicant respectfully traverses these rejections with respect to those claims still pending.

Anticipation under Section 102 of the Patent Act requires that a prior art reference disclose every claim element of the claimed invention. See, e.g., *Orthokinetics, Inc. v. Safety Travel Chairs, Inc.*, 806 F.2d 1565, 1574 (Fed. Cir. 1986). In order to establish a *prima facie* case of obviousness, all of the claim limitations must be taught or suggested by the prior art. Suzuki fails to disclose, teach or suggest every claim element of the claimed invention. For example, Suzuki fails to disclose, teach or suggest "wherein the voltage level range of the limiting current region for each level of the oxygen concentration is changeable with a temperature of the sensor element due to a sensor output characteristic changing with the temperature of the sensor element, a plurality of voltage level ranges of the limiting current region in a plurality of temperature conditions of the sensor element overlap with one another

¹ Applicant notes that the named inventors of the Suzuki reference (U.S. '940) are also named among the inventors in the present application. Applicant further notes that assignee of the Suzuki reference is the same as that of the present application.

within a temperature-considered voltage level range for each level of the oxygen concentration, the voltage level range of the limiting current region at a minimum temperature in a temperature range actually attainable in a using environment of the sensor element and the voltage level range of the limiting current region at a maximum temperature in the temperature range overlap with each other within the temperature-considered voltage level range for each level of the oxygen concentration, and said applied voltage control unit sets a single voltage line as the applied voltage line such that the single voltage line passes through the temperature-considered voltage level ranges of the limiting current regions for the levels of the oxygen concentration,” as required by independent claim 1 and its dependents. Similar comments apply to independent claims 45 and 75.

The above-noted claim limitations are supported by, for example, Figs. 8-9 and page 27, line 18 to page 29, line 18 of the present application.

The inventions of claims 1, 45 and 75 require that a applied voltage control unit sets a single voltage line as an applied voltage line such that the single voltage line passes through temperature-considered voltage level ranges of the limiting current regions for the levels of the oxygen concentration. The voltage level ranges of the limiting current region in many temperature conditions of the sensor element overlap with one another within the temperature-considered voltage level range for each level of the oxygen concentration. The voltage level range of the limiting current region at the minimum temperature of the sensor element and the voltage level range of the limiting current region at the maximum temperature of the sensor element overlap with each other within the temperature-considered voltage level range for each level of the oxygen concentration.

Accordingly, because the applied voltage control unit sets the single applied voltage line which passes through the temperature-considered voltage level ranges of the limiting current regions for the levels of the oxygen concentration, the applied voltage control can be implemented without changing the inclination of the applied voltage line even when the element temperature is changed. Moreover, since the setting of the single applied voltage line can cope with the variation of the element temperature, the structure of the gas concentration detecting apparatus can be simplified (see page 29, lines 10-18 of the specification). For example, this apparatus needs neither a memory for always storing data of a plurality of application voltage lines, a temperature detector for always measuring the temperature of the sensor element to output an application voltage switch signal, nor a selector for selecting one application voltage line corresponding to the sensor element temperature as an applied voltage line on the basis of the signal each time the voltage is applied to the sensor element. This apparatus merely needs a memory for storing the single applied voltage line passing through the temperature-considered voltage level ranges of the limiting current regions for the levels of the oxygen concentration.

By this Amendment, independent claim 1 has been at least amended to incorporate the features of now canceled dependent claims 23 and 104 therein, independent claim 45 has been at least amended to incorporate the features of now canceled dependent claims 117 and 118 therein, and independent claim 75 has been at least amended to incorporate the features of now canceled dependent claims 83 and 84 therein. Again, these features added to the claims 1, 45 and 75 are supported by Figs. 8-9 and page 27, line 18 to page 29, line 18 of the present application.

With respect to claims 23, 104, 117-118 and 83-84 (canceled limitations thereof now incorporated into independent claims 1, 45 and 75 as noted above), the Office Action does not

directly address the claim limitations. For example, the Office Action does not identify a particular part (e.g., what specific figure(s) and/or column(s) and line number(s)) which allegedly teaches or suggests the limitations of claims 23, 104, 117-118 and 83-84. Instead, the Office Action improperly dismisses these explicitly recited limitations as either being (1) an intended use of the device or (2) an inherent property of the device. See section 4 (page 3) of the Office Action.

The Office Action's rationale for dismissing the above-noted claim limitation is improper. First, the above-noted claim features (e.g., "wherein the voltage level range of the limiting current region for each level of the oxygen concentration is changeable with a temperature of the sensor element due to a sensor output characteristic changing with the temperature of the sensor element, a plurality of voltage level ranges of the limiting current region in a plurality of temperature conditions of the sensor element overlap with one another within a temperature-considered voltage level range for each level of the oxygen concentration, the voltage level range of the limiting current region at a minimum temperature in a temperature range actually attainable in a using environment of the sensor element and the voltage level range of the limiting current region at a maximum temperature in the temperature range overlap with each other within the temperature-considered voltage level range for each level of the oxygen concentration, and said applied voltage control unit sets a single voltage line as the applied voltage line such that the single voltage line passes through the temperature-considered voltage level ranges of the limiting current regions for the levels of the oxygen concentration," from claims 23 and 104 in claim 1) are recited in the body of claims 1, 45 and 75 and thus clearly impose explicit and specific limitations on the claimed gas concentration detecting apparatus,

and in particular on the applied voltage control unit of the gas concentration detecting apparatus. These explicitly required claim limitations are thus not a mere intended use, and cannot be summarily dismissed – as in the Office Action. As described by MPEP 2143.03, “All words in a claim must be considered in judging the patentability of that claim against the prior art.” *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970). The rationale expressed by the Office Action dismissing explicitly recited claim limitations as mere intended use is clearly improper in that it fails to consider all the features. Further, according to MPEP 2173.05(g), there is nothing inherently wrong with the use of functional language. Functional language does not, in and of itself, render a claim improper (see e.g., *In re Swinehart*, 439 F.2d 210, 169 USPQ 226 (CCPA 1971)).

Second, the above-noted claim limitations are not inherent from the teachings of Suzuki. As discussed in MPEP Section 2112, “To establish inherency, the extrinsic evidence ‘must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.’” *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999) (citations omitted). There is absolutely nothing in the record that suggests that above-noted claim limitations would be necessarily present (or even may be present) from the teachings described by Suzuki.

Suzuki teaches a gas concentration sensing apparatus wherein another application voltage line Ld is provided in addition to the application voltage line Lc determined based on the high-temperature condition. The application voltage lines Lc and Ld are selectively used as an

applied voltage line in accordance with information of the element temperature which is momentarily obtained (see col. 16, lines 22-28).

Namely, a plurality of application voltage lines having different inclinations are provided in advance on the V-I coordinate, and one of the application voltage lines is selected as an applied voltage line in accordance with the temperature of the sensor element. Accordingly, it becomes possible to accurately detect the air-fuel ratio even when the sensor element temperature is decreased unexpectedly (see lines 2-8 of column 17).

However, the apparatus of Suzuki needs to change the inclination of the applied voltage line each time the temperature of the sensor element is changed. Therefore, in Suzuki, the applied voltage control is complicated.

Further, Suzuki inevitably needs a memory for always storing data of a plurality of application voltage lines, a temperature detector for always measuring the temperature of the sensor element and outputting an application voltage switch signal, and a selector for selecting one application voltage line corresponding to the sensor element temperature as an applied voltage line on the basis of the signal each time the voltage is applied to the sensor element. Therefore, the apparatus of Suzuki is undesirably complicated.

For at least the above reasons, Applicant requests that the various rejections under 35 U.S.C. §102 and §103 over Suzuki be withdrawn.

Claims 1, 3, 5, 7, 11, 13, 17, 19, 23, 25, 27, 35, 37, 39, 43, 45, 49-51, 53, 59, 61, 75-85, 89-92, 94-97, 100-108, 123-126, 131, 133-139 and 144-146 were rejected under 35 U.S.C. §103 as allegedly being unpatentable over Suzuki in view of JP '388. Claims 29, 31, 33, 86-88, 99, 109-112, 127-130, 132 and 140-143 were rejected under 35 U.S.C. §103 over the three-way

combination of Suzuki in view of JP '388 and in further view of Takami et al. (U.S. '641, hereinafter "Takami"). Claims 67, 69, 93, 98, 147 and 148 were rejected under 35 U.S.C. §103 as allegedly being unpatentable over the three-way combination of Suzuki in view of JP '388 in further view of Suzuki et al. (U.S. '773, hereinafter "Suzuki '773"). None of these secondary or tertiary references resolve the above-described deficiencies of Suzuki with respect to "wherein the voltage level range of the limiting current region for each level of the oxygen concentration is changeable with a temperature of the sensor element due to a sensor output characteristic changing with the temperature of the sensor element, a plurality of voltage level ranges of the limiting current region in a plurality of temperature conditions of the sensor element overlap with one another within a temperature-considered voltage level range for each level of the oxygen concentration, the voltage level range of the limiting current region at a minimum temperature in a temperature range actually attainable in a using environment of the sensor element and the voltage level range of the limiting current region at a maximum temperature in the temperature range overlap with each other within the temperature-considered voltage level range for each level of the oxygen concentration, and said applied voltage control unit sets a single voltage line as the applied voltage line such that the single voltage line passes through the temperature-considered voltage level ranges of the limiting current regions for the levels of the oxygen concentration," as required by independent claim 1 and its dependents. Similar comments apply to independent claims 45 and 75. Applicant thus requests withdrawal of the above-noted rejections under 35 U.S.C. §103.

New claims:

New claims 149-151 have been added. Each of these claims is deemed to be allowable for at the reasons discussed above with respect to respective base independent claims 1, 45 and 75. The additional subject-matter of these claims are supported by, for example, Fig. 9 and page 28, line 26 to page 29, line 9 of the present specification. Also, the cited prior art fails to teach or suggest the determination of the low-voltage side end points of the limiting current regions at the minimum temperature of the sensor element for the minimum and maximum levels of the oxygen concentration or the determination of the high-voltage side end points of the limiting current regions at the maximum temperature of the sensor element for the minimum and maximum levels of the oxygen concentration to set the applied voltage line.

Conclusion:

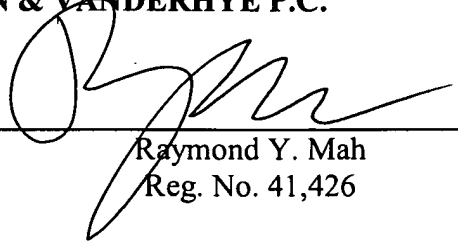
Applicant believes that this entire application is in condition for allowance and respectfully requests a notice to this effect. If the Examiner has any questions or believes that an interview would further prosecution of this application, the Examiner is invited to telephone the undersigned.

SUZUKI et al
Appl. No. 10/765,881
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Respectfully submitted,

NIXON & VANDERHYE P.C.

By: _____

A handwritten signature in black ink, appearing to be 'R. Mah', written over a horizontal line.

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